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ADAPTATION OF FIBER FLAX TO THE SOUTH ATLANTIC STATES

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INTRODUCTION

The early settlers in the South Atlantic States grew flax in colonial days, but the invention of the cotton gin in 1793 soon did away with the home flax industry. Recently there has been a renewed interest to promote the growing of flax in this section. This interest has caused certain farmers and companies to grow small acreages of fiber flax, and the crops have usually resulted in failures or in uncertain results. Since 1900, experiments in growing fiber flax in many localities from Virginia to Louisiana have been undertaken by individuals, private companies, State experiment stations, and a few by the United States Department of Agriculture. In many instances reports have stated that the plants started out well but ceased growing at the beginning of hot dry weather. In only a few cases have the plants been harvested and fiber prepared, and there are no definite published records of actual yields. Numerous statements that the plants "grew well," or even that they were "over 3 feet tall," have little meaning in the absence of actual measurements. In view of the demand for more definite information, a series of experiments have been conducted and the results recorded.

A CONTRACT CROP

During the last half century fiber flax has always been grown in the United States under contract between farmers and flax-mill

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[1] The writers wish to express their appreciation to the cooperators who contributed information and results included in this circular. Primarily among these are S. C. Clapp, Director of the Mountain Branch Station of the North Carolina Agricultural Experiment Station, Swannanoa, N. C.; the agricultural department of the Southern Railway Co., Atlanta, Ga.; the agricultural department of the Seaboard Air Line Railway Co., Savannah, Ga.; the Smith & Dove Manufacturing Co., Andover, Mass.; and the Stevens Linen Works, Webster, Mass.

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companies. The contracts for acreage are made out before the flax is sown, and it would be very unwise for a farmer to grow fiber flax without a contract which would guarantee him a market and a definite price for his straw when harvested.

AREAS IN THE UNITED STATES SUITED TO FIBER FLAX

Fiber flax has been grown on a commercial scale for many years in two areas in the United States. These commercial growings have proved its adaptation to eastern Michigan and to the Willamette Valley in Oregon. Besides these States, fiber flax has been grown repeatedly on a smaller scale in Washington, Minnesota, and Wisconsin. A few tests have been conducted in New York with favorable results, and undoubtedly if the proper soils were selected fiber flax would grow very well throughout the New England States. Flax when grown for fiber has never given very satisfactory returns in any of the Southern States or in sections where the climatic conditions would subject the crop to a prolonged drought or to prolonged temperatures above 75° F. during the period of growth.

The quality of the fiber produced in Oregon and some of the samples of fiber produced in other States equals the better grades (higher qualities) of water-retted European fiber. A few statements have been made to the effect that flax fiber of good quality could not be produced in the United States. These statements may have been based on attempts to produce fiber flax in regions not adapted to it or to obtain fiber for spinning purposes from the straw of the flax grown in the Central West for seed and oil production. It should be clearly understood that flax grown for fiber is distinctly different in type from flax grown for seed production. Although the two plants belong to the same botanical species, they have been bred for entirely different purposes.

CLIMATIC CONDITIONS

One of the most important factors contributing to success in fiber-flax production is the climatic conditions under which the flax is grown. Flax may be grown under a wide range of conditions, but the weather influences greatly the response in growth, yield, and quality of the fiber. Repeated attempts in many countries to grow fiber flax in warm or dry regions have been unsuccessful, but attempts to grow it in regions having a cool moist climate have met with better success, because the crop requires an abundance of moisture during the early growth.

The South Atlantic coast region is too warm for fiber flax if it is planted in April or later, but persons interested in growing flax have pointed out that if it is seeded in January and February in Georgia and in March in Virginia it will grow under cool, moist conditions similar to those of the flax-growing seasons in Michigan and Oregon. Later planting in those States would be very undesirable except in the Allegheny or Blue Ridge mountain regions where the altitude affects the season. Climatic conditions in the high altitudes of these mountains are similar to those of the Northern States in regard to temperature. However, in these mountainous regions there is not a large amount of productive soil particularly adapted to flax culture.

SOIL REQUIREMENTS

Another factor contributing to success in fiber-flax production is the soil. A good crop of flax can not be obtained without the right type of soil as well as the right kind of climate. Experienced flax growers place a great deal of emphasis on the choice of good soil.

The type of soil, besides influencing the yield, affects the quality of straw and fiber. This is a point that many farmers might be inclined to overlook, and it is the quality that influences greatly the selling price of the fiber.

Previous success has proved that a rich, medium-heavy loam soil well supplied with humus is the best flax soil. Light sandy soils are undesirable, partly because they have poor water-retaining ability and dry out too quickly in short periods of drought. A clay subsoil is beneficial for retaining moisture and supplying it when necessary, provided it does not form a hardpan and interfere with proper drainage. Proper drainage is essential, although a great amount of flax has been grown upon poorly drained soil.

The types of soil in the South Atlantic coastal plains are chiefly light sandy loams, and these are not the best types for fiber flax. The experiments reported in this circular were upon several types of soil, and with few exceptions the best results were on the heavier types of silt loam or clay soils. Under no condition should fiber flax be grown in this section on soils lighter than Norfolk sandy loam, and it is extremely doubtful whether this type is satisfactory for flax. Even in Norfolk sandy loam fiber flax may grow well only in fields where the soil has been improved with cover crops and fertilizer and where a clay subsoil is fairly close to the surface.

CULTURAL METHODS

A well-prepared seed bed is essential to a high yield. The best results are usually obtained when the soil is plowed in the fall and well worked in the spring, in order that when the seed is sown with a drill or broadcast it will be evenly covered and thus make a uniform growth from the start.

Fiber flax should be seeded at the rate of about 84 pounds (6 pecks) of seed to the acre. Any machine that distributes the seed uniformly over the ground is suitable for sowing the seed. The land should be free from weeds, since the separation of the weeds from the flax is practically impossible. During the growing season the flax requires no further care.

The method of harvesting will depend largely upon what use is to be made of the fiber. For the production of upholstery tow, the flax is usually cut with a mowing machine; but for the production of spinning fiber, it is pulled either by hand or with a pulling machine.

The processes of retting and scutching are usually carried on in a factory and are not problems with which the farmer or flax grower has to deal.

RESULTS OF EXPERIMENTAL WORK

Results obtained from experimental plots of flax grown upon soil of different types and under different climatic conditions at a number of different locations in the South Atlantic States are reported in the following pages. The plots were grown and supervised by different cooperators, but the straw, after pulling, was sent to the fiber-flax station of the United States Department of Agriculture at East Lansing, Mich., where fiber and seed determinations were made.

EXPERIMENTS AT SWANNANOA, N. C.

Fiber flax was grown for three years at the Mountain Branch Station of the North Carolina Agricultural Experiment Station, located at Swannanoa. The elevation of the Swannanoa station is approximately 2,300 feet, making the climate there very different from that on the lower coastal plains of eastern North Carolina. In 1926, the first year flax was grown, the weather was abnormally dry. The following two years were approximately normal in temperature and rainfall. The yields of the flax grown at Swannanoa are shown in Table 1.

TABLE 1.—*Acre yields from flax grown at Swannanoa, N. C., 1926–1928*

Year	Straw		Seed	Fiber		Height
	Unthreshed	Threshed		Line	Tow	
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Inches*
1926	930	615	128	----------	----------	24
1927	4,491	3,201	454	245	188	29
1928	2,339	1,834	160	245	73	33

Poor yields were obtained the first year, and approximately average yields of straw, fiber, and seed were obtained the following two years. The yields in 1926 and 1928 would have been higher if the stand of flax had been better. The flax was sown at the standard rate of 84 pounds of seed to the acre, but it did not have as good a stand as normally. This was partly due to the cultural methods employed and not to conditions in this particular region. The soil used each year was a sandy to silt loam bottom land along the Swannanoa River. No fertilizers were applied to the flax, but there may have been residual effects from fertilizers applied in previous years.

The flax straw was shipped each year to East Lansing, Mich., where it was retted and scutched in order to determine the fiber yields. After these determinations had been made, the fiber obtained in 1927 and 1928 was submitted to the Smith & Dove Manufacturing Co., Andover, Mass., for a spinning test, and this company reported as follows:

> North Carolina water-retted flax grown in 1927 had a greenish-colored fiber, somewhat harsh, but clean and strong. It was of better quality than Michigan water-retted fiber produced in 1926, but not as good for twines as either Michigan dew-retted fiber produced in 1928 or the fiber produced in North Carolina in 1928. The fiber after roughing and hackling yielded approximately 50 per cent. It compared with a medium-grade imported continental flax. The tow obtained in 1927 was a medium grade of pulling tow with good strength, fair cling, but rather dirty in places. It was equal to a medium grade of Canadian flax pullings.
>
> North Carolina water and dew retted flax grown in 1928 yielded a good, clean, flexible fiber which was strong and split finer in the hackling than Michigan

dew-retted fiber produced in 1928. It was suitable for spinning up to 16 lea damp. It compared with a good grade of continental dew-retted fiber. The fiber after roughing and hackling yielded approximately 50 per cent. It was possibly more suitable for spinning fine lea than the dew-retted Michigan fiber produced in 1928. Tow obtained from the fiber in 1928 was a good average quality of pulling tow, having a good strength and cling, medium clean, a little softer than Michigan dew-retted fiber tow, and equal to good Canadian flax pullings.

When the samples of fiber were spun, they yielded as shown in Table 2.

Table 2.—*Results obtained in preparing raw fiber of flax grown at Swannanoa, N. C., in 1927 and 1928, for spinning (the roughing and hackling processes)*

[The raw flax fiber was hackled over a machine finishing 30 pins per inch]

Stage of flax fiber	Water-retted flax grown in 1927		Water and dew retted flax grown in 1928	
	Pounds	*Per cent*	*Pounds*	*Per cent*
Raw flax fiber	40	100	39	100
Roughing process:				
(1) Roughed flax fiber	32	80	31	79.5
Hackling process—				
(*a*) Tipples [1]	18	56.3	18	58.1
(*b*) Machine tow	14	43.7	13	41.9
(*c*) Waste	0	0	0	0
(2) Roughed tow	7	17.5	6	15.4
(3) Waste	1	2.5	2	5.1

[1] Long-hackled fiber is called tipples.

Strength tests were made upon the yarns spun from the North Carolina fiber, and the spinner reported that the yarns were not as strong as similar yarns that they were making for their regular trade. In their opinion the fiber for their purpose was not equal to the best of the dew-retted continental flaxes and the water-retted fiber was much inferior to Irish or Courtrai, Belgium, water-retted flaxes, which are the flaxes most used for thread manufacture.

EXPERIMENTS IN GEORGIA, SOUTH CAROLINA, AND TENNESSEE

In 1929 the agricultural departments of the Southern Railway Co. and the Seaboard Air Line Railway Co. grew experimental plots of fiber flax at seven different locations in Georgia, one in South Carolina, and one in Tennessee. There were a total of 14 experimental plots at these different locations. In 1930 the Seaboard Air Line Railway again planted flax, near Savannah, Ga. These experimental plots were grown upon soil of several different types and under somewhat different conditions in climate and elevation. Table 3 shows the types of soil at the various locations, together with a few notes upon the cultural method used in growing the flax, as well as the yields obtained. In only three cases out of the 13 where yields were obtained did the yields exceed 3,000 pounds of unthreshed straw per acre, and in two of these cases only by a few pounds. Three thousand pounds of unthreshed straw per acre may be considered only an average yield of flax when grown under favorable conditions. Figure 1 shows the best field of flax near Savannah, Ga., being pulled in 1929.

TABLE 3.—*Results from experimental plots of flax in Georgia, South Carolina, and Tennessee, grown in 1929 and 1930*

[The flax was all of the Saginaw variety in 1929 and of the J. W. S. variety in 1930]

Year and location	Date planted	Date harvested	Rate seeded per acre	Soil type	Fertilizer per acre and analysis	Height grown	Yield per acre: Unthreshed	Yield per acre: Threshed	Yield per acre: Seed	Yield per acre: Fiber: Line	Yield per acre: Fiber: Tow
1929			*Pounds*		*Pounds*	*Inches*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Hahira, Ga.:											
Farm 1	Feb. 11–13	May 23	100	Norfolk sandy loam	None	25–32	3,080	2,210	383	[1] 323 [2] 284	[1] 126 [2] 116
Farm 2	do	May 27	100	do	do	25–30	2,570				
Cecil, Ga	do	May 24	100	Tifton sandy loam	do	19	1,040				
Baxley, Ga	Mar. 6	May 31	100	Norfolk sandy loam	do	17	1,580				
Clayton, Ga	Mar. 21	July 10	100	Congaree or Toxaway silt loam	do		2,970				
Savannah, Ga.:											
Farm 1	Feb. 15	May 17	70	Norfolk sandy loam	do	26–27	2,998	2,005	742	[1] 412	
Farm 2	do	May 20	70	do	400 4–8–4	28–30	3,425	2,103	829	[1] 435	
Statesboro, Ga	Feb. 25	(3)									
Fairfax, Ga	do	(3)									
Cleveland, Tenn	Mar. 29	July 12			None		[4] 600				
Pregnall, S. C.:											
Plot 1	Feb. 25	May 28	100	Norfolk sandy loam [5]	500 3–8–3	22	1,070				
Plot 2	do	June 17	100	do	None	12–14	484				
Plot 3	do	June 6	100	do	100 $NaNO_3$	24	1,210				
Plot 4	Mar. 9	June 17	100	do	None	10	484				
1930											
Savannah, Ga.[6]	Feb. 26	May 29	70	do	500 3–9–3	36–48	6,000	4,860	469	703	[1] 280

[1] Calculated yield when water-retted.
[2] Calculated yield when dew-retted.
[3] Abandoned at harvest time because of continuous rain.
[4] Injured by flood water.
[5] Plots 1 to 4 were all on the same farm. It was newly cut-over pineland with no clay subsoil.
[6] Another experimenter calculated this crop to yield 11.83 bushels of seed and 1,225 pounds of fiber per acre.

It was impossible to secure accurate climatological observations from these various locations, but from information received from farmers who grew these various experimental plots the general impression seemed to be that there was a great deal more rainfall during the spring of 1929 than normally fell in these localities. It would appear doubtful whether satisfactory yields could be obtained in this section over a number of years unless the flax was grown upon the very best soil and received the best cultural practice.

The yields obtained upon the flax grown at Savannah, Ga.. were determined by Lowry & Grant (Inc.), New York, N. Y., but no report was made on the quality of the fiber obtained. Some straw from the best field of flax grown at Hahira, Ga., was sent to East Lansing, Mich., where it was divided into two lots, one of which was dew-retted and the other water-retted. The straw was then scutched and the fiber was sent to the Smith & Dove Manufacturing Co., who reported as follows:

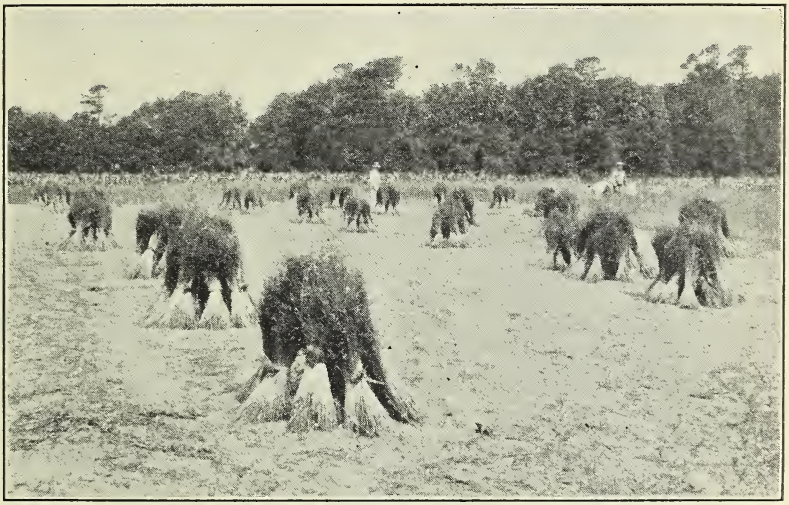

FIGURE 1.—A field of Saginaw fiber flax near Savannah, Ga., being pulled in 1929

> The Hahira water-retted fiber was uneven in length with some fibers very short, indicating either that the flax was short in growth or broken in scutching. Further, the sample of fiber was dry, lacking in nature, and was very scabby, that is, small particles of shives were still clinging to the fiber. The Hahira dew-retted fiber had a good length and was of good quality, but the fiber was somewhat nonuniform in strength. These samples of fiber were somewhat similar to the Russian Group V.

It is possible that the fiber might have been classed a little higher if it had been possible to have it prepared by men more acquainted with the retting and scutching. The scutching was not as good as it might have been, owing to the fact that scutching is almost a lost art in the United States. The retting was not uniform in all cases because the straw when it was received in Michigan showed various degrees of maturity and nonuniformity from weathering and bleaching. These factors all combined to make it very difficult to secure a uniform sample of fiber.

The flax grown near Savannah, Ga., in 1930 by the Seaboard Air Line Railway Co. made a remarkable growth. The growth of the flax in the shortest area in the field was not less than 36 inches in height. The height ranged to 48 inches with a possible average of the entire field of 42 inches high or better. If flax similar to that grown in 1930 could always be produced in Georgia, it would be a profitable crop, provided it yielded a fiber of good quality. A sample of this 1930 crop was sent to Michigan, where it was retted and scutched, and the fiber obtained was later sent to the Stevens Linen Works, Webster, Mass. This company reported as follows:

> It is difficult to judge the spinning quality of fiber of this character, as the sample lacks nature. In previous years we have experimented with flax of about this quality and have had much difficulty in getting it over our machinery due to the fiber "licking up" on the pressing rolls, and a definite statement without a spinning trial is impossible.

The fiber, however, was judged superior to fiber produced in Virginia the same year.

EXPERIMENTS IN VIRGINIA

A somewhat novel experiment was carried out in Virginia in 1929 and 1930, as a result of interest that had been created by a company which advertised the possibility of growing two crops of fiber flax in the same year on the same ground. The director of the Virginia Agricultural Experiment Station decided to have flax planted at each of the nine Virginia experiment substations, and after the first crop was harvested early in the summer the land was seeded again to flax and a second crop was produced in some cases. The results from these experiments are shown in Table 4. The table shows the wide range of soil types upon which the flaxes were grown, as well as different fertilizer applications and yields obtained.

TABLE 4.—*Results from two successive crops of fiber flax on the same land in the same season on experimental plots in Virginia in 1929 and 1930*

[The flax was all of the Saginaw variety in 1929 and of the J. W. S. variety in 1930, seeded at the rate of 90 pounds per acre]

Year, crop, and location	Date planted	Date harvested	Soil type	Fertilizer per acre and analysis	Yield per acre				
					Unthreshed	Threshed	Seed	Fiber	
								Line	Tow
1929									
First crop:				*Pounds*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*
Chatham	Mar. 11	June 25	Cecil sandy loam	400 3- 8-3	2,320	1,707	199	[1] 259 [2] 269	[1] 101 [2] 150
Martinsville	Mar. 15	do	Davidson clay loam	600 4-12-4	4,000	2,613	456	[1] 467 [2] 482	[1] 123 [2] 144
Williamsburg	Mar. 25	June 28	Norfolk sandy loam	500 4- 8-4	4,000	2,553	381	[1] 310 [2] 247	[1] 198 [2] 204
Holland	Mar. 15	June 20	do	600 4-12-4	4,460	3,558	306	[1] 432	[1] 200
Blacksburg	Mar. 21	July 10	Hagerstown silt loam	600 4-12-4	3,520	2,398	521	[1] 244	[1] 284
Appomattox	Mar. 20	do	Cecil clay loam	600 4- 8-4	1,400				
Fisherville	Mar. 21	July 1	DeKalb shale	600 4-12-4	6,000	4,007	597	[1] 591	[1] 327
Bowling Green	Mar. 20	July 10	Norfolk sandy loam	600-4-12-4	2,600				
Second crop:									
Martinsville	July 15		Davidson clay loam	None	1,920	1,322	125		(3)
Williamsburg	July 2	Oct. 2	Norfolk sandy loam	do	1,300				
Blacksburg	July 20	Oct. 10	Hagerstown silt loam	do	5,210	3,844	69	[1] 128	[1] 426
Fisherville	July 10	Oct. 1	DeKalb shale	do	1,960	1,178	173	[1] 40	[1] 151
Chatham			Cecil sandy loam	do					(4)

[1] Calculated yield when water-retted.
[2] Calculated yield when dew-retted.
[3] Straw too rotten to be scutched.
[4] Too poor to harvest.

TABLE 4.—*Results from two successive crops of fiber flax, etc.*—Continued

Year, crop, and location	Date planted	Date harvested	Soil type	Fertilizer per acre and analysis	Yield per acre				
					Unthreshed	Threshed	Seed	Fiber	
								Line	Tow
1930									
First crop:				*Pounds*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*
Holland	Apr. 28	July 29	Norfolk sandy loam	500–4– 8–4	1, 640	1, 254	108	68	121
Appomattox	Apr. 14	July 11	Cecil sandy loam	600 4– 8–4	3, 600	2, 329	292	44	398
Staunton	Mar. 15	June 18	Shale	400 2–12–2	2, 200	1, 260	215	34	187
Charlotte	Mar. 20	July 25	Gray soil, heavy red subsoil.		[5]1, 288	660	262	29	115
Bowling Green	Mar. —		Norfolk sandy loam		2, 400	1, 632	227	58	145
Chatham		July 1	Cecil sandy loam		1, 240				
Second crop:									
Holland	Aug. 4 [6]								
Appomattox	(7)								
Staunton	June 21 [8]								
Chatham	(8)								

[5] Cut flax; other yields are pulled flax.

[6] Emerged Sept. 1, but made no growth.

[7] Did not get out of the ground.

[8] No crop harvested; failure due to dry weather.

The yields were, on the average, better than those produced in the States farther south. Under commercial conditions the yields of the first crop would be considered average. The yields of the second crop in all cases with one exception were very poor or a failure. In some cases the second sowing did not even result in anything that could have been called a crop, as the flax emerged poorly and grew to only a few inches in height. It is very apparent that it is entirely impracticable to grow a second crop under these conditions.

Samples of unthreshed straw from a number of the Virginia experiment substations were sent to East Lansing, Mich., where they were retted and scutched. In some cases the samples of unthreshed straw after being received at East Lansing were divided into two equal lots and one was dew-retted and the other water-retted. The fiber yields shown in Table 4 are calculated for the yield of fiber per acre obtained by each method of retting. In 1929 the fiber was sent to the Smith & Dove Manufacturing Co. and in 1930 to the Stevens Linen Works, where it was judged for spinning quality. The 1929 samples were all grouped in the Russian Group V class and the following remarks were made:

> The water-retted samples all appeared rather dry and lacking in nature. The dew-retted samples varied considerably in color, indicating that the retting was possibly more or less uneven, and some of the samples showed weakness, which was possibly due to overretting. Most of the samples had a fair length indicating that the growth of the plant was satisfactory, and possibly some of the poor fiber was a result of the handling and the technic used in retting and scutching. The different samples varied considerably in quality, in that some had good strength and others were weak. The color was good or fair in some and poor in others, and most of them lacked nature, but in one or two the fibers showed very good nature and quality.

It is not definitely known how much of the Russian fiber falls into Group V, but some statistics from Latvia indicate that Group V for the Latvian flaxes is below the mean of the crop and varies in different years and in different sections from approximately 2 to 18 per cent of the entire crop. The greater part of the fiber produced in Latvia would grade one or two grades higher than Group V. The Latvian fiber, however, is a good fiber, and not all of the Russian fiber is equal to it in quality. The fact remains that this fiber did not rank very high compared with continental flaxes, and it is doubtful whether in general practice the quality could be raised more than one or two grades.

Some samples of 1929 Virginia fiber were sent to the Stevens Linen Works, and this company reported that the quality was difficult to judge, as the samples lacked spinning quality. While certain samples from Fisherville and Blacksburg were strong and clean, they were too hard and brittle to be spun to good advantage, and the fiber produced at Williamsburg in 1929 and at Holland in 1930 was too short to be spun profitably.

The fiber produced from the second crops of flax grown in 1929 and from all the tests conducted in Virginia in 1930, with the exception of the fiber from Holland, was considered of such poor quality as to be of very low value and was not even submitted to a spinner.

DISCUSSION

It is not good policy to draw conclusions from one or two years' results, but as these experiments were carried on at 19 different locations involving 41 tests in experiments that varied from one to three years at one place, it is believed that certain general conclusions may be drawn applying to the whole territory. The results in general indicate that average yields may be obtained in certain locations, if the flax is planted upon the more fertile soils and given the proper cultural treatments. Throughout the entire South Atlantic section there is not very much land that could be considered ideal soil for fiber-flax culture. The soils in general are light sandy soils, and it is customary to fertilize them heavily with artificial fertilizers for the production of a crop. While fiber flax will respond to fertilizers under certain conditions, ordinarily it is advisable to plant it upon a medium heavy fertile soil and not apply fertilizer, as certain fertilizers if present in excess may have an injurious effect upon the fiber.

The quality of the fiber is likely always to be of a low grade and thus command only a medium to low price. It seems very improbable, according to these tests, that the higher grades of fiber may be produced under average conditions throughout this region. If on account of war or other causes there should arise a demand for flax fiber, flax might be grown in this section profitably enough to produce a fiber suitable for coarse yarns; but under present economic conditions the cultivation of fiber flax can not be recommended for this region.

Interest in fiber-flax production is constantly maintained through the invention of new processes for treating flax and machines for manufacturing, which eliminate the old methods of retting and scutching the straw. Should any of the new methods prove efficient enough to be adopted on a commercial scale, it is possible that a low grade of fiber might be as well suited for spinning as a higher grade. Under such conditions the South Atlantic States might be in a position to grow flax for fiber.

As mentioned previously, the yields from a second crop of flax during the late summer months indicate that it is useless to consider this as a profitable practice. The quality of the straw produced from the second crop in no way equals the quality of the first crop, as the straw of the second crop is very hard, making it more difficult to separate the fiber from the wood. The second crop makes only a short growth, which, combined with the woody stem, yields only a low percentage of fiber. The practice of growing a crop upon the same soil twice in succession is not good farming practice. Diseases are likely to be much more serious upon a second crop than upon the first, and with two crops in the same year it is not possible to obtain the benefit that results from rotation.

SUMMARY

Results are recorded for the first time upon the yield of fiber flax grown in the South Atlantic States, and reports are presented upon the quality of fiber obtained.

Fiber flax is a contract crop, and a farmer should not grow it without first having a contract that guarantees him a market for his crop when harvested.

Previous experimental trials with fiber flax have not included the South Atlantic States in the area adapted for fiber flax in the United States because of climatic conditions and soil types.

Three years' results at Swannanoa, N. C., gave lower than average yields. The fiber was of average quality but lacked strength when spun.

Numerous experiments in Georgia, South Carolina, and Tennessee have given conflicting results. In general the flax failed, but two crops were average and one was exceptionally good. The fiber was judged below the average of European fiber.

Fiber flax grown at several agricultural experiment substations in Virginia gave average yields when fertilized. The yields were low in 1930 because of abnormally dry weather. The quality of the fiber was slightly below the average of European fiber and lacking in nature.

A second crop of fiber flax upon the same land usually resulted in failure. This method should never be attempted.

The results of these experiments indicate that the conditions of soil and climate are generally not well adapted to the production of fiber flax in the South Atlantic States.

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